

NVIDIA CONNECTX-6 DX

Ethernet SmartNIC

Advanced Networking and Security for the Most Demanding Cloud and Data Center Workloads

NVIDIA® ConnectX®-6 Dx is a highly secure and advanced smart network interface card (SmartNIC) that accelerates mission-critical cloud and data center applications, including security, virtualization, SDN/NFV, big data, machine learning, and storage. ConnectX-6 Dx provides up to two ports of 100Gb/s or a single port of 200Gb/s Ethernet connectivity and is powered by 50Gb/s (PAM4) or 25/10 Gb/s (NRZ) SerDes technology.

ConnectX-6 Dx features virtual switch (vSwitch) and virtual router (vRouter) hardware accelerations delivering orders-of-magnitude higher performance than software-based solutions. ConnectX-6 Dx supports a choice of single-root I/O virtualization (SR-IOV) and VirtIO in hardware, enabling customers to best address their application needs. By offloading cloud networking workloads, ConnectX-6 Dx frees up CPU cores for business applications while reducing total cost-of-ownership.

In an era where data privacy is key, ConnectX-6 Dx provides built-in inline encryption/decryption, stateful packet filtering, and other capabilities, bringing advanced security down to every node with unprecedented performance and scalability.

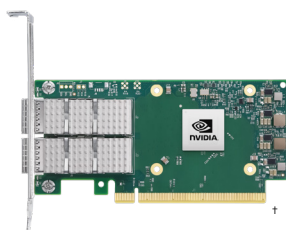
Built on the solid foundation of NVIDIA's ConnectX line of SmartNICs, ConnectX-6 Dx offers best-in-class RDMA over Converged Ethernet (RoCE) capabilities, enabling scalable, resilient, and easy-to-deploy RoCE solutions. For data storage, ConnectX-6 Dx optimizes a suite of storage accelerations, bringing NVMe-oF target and initiator offloads.

PRODUCT SPECIFICATIONS

Maximum total bandwidth	200Gb/s
Supported Ethernet speeds	10/25/40/50/100/200GbE
Number of network ports	1/2
Network interface technologies	NRZ/PAM4
Host interface	PCIe Gen4.0 x16, with NVIDIA Multi-Host™ technology
DPDK message rate	Up to 215Mpps
Platform security	Hardware root-of-trust and secure firmware update
Form factors	PCIe HHHL, OCP2, OCP3.0 SFF
Network interfaces	SFP+, QSFP+, DSFP

SOLUTIONS

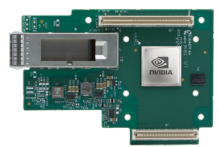
- > Cloud-native, web 2.0, hyperscale
- > Enterprise data centers
- > Cybersecurity
- > Big data analytics
- > Scale-out compute and storage infrastructure
- > Telco and network function virtualization (NFV)
- > Cloud storage
- > Machine learning and AI
- > Media and entertainment



PCIe x16 HHHL Card



OCP 3.0 Small Form Factor



OCP 2.0 Form Factor

*For illustration only. Actual products may vary.

Features(*)

Network Interface

- > Dual ports of 10/25/40/50/100 GbE, or a single port of 200GbE

Host Interface

- > 16 lanes of PCIe Gen4, compatible with PCIe Gen2/Gen3
- > Integrated PCI switch
- > NVIDIA Multi-Host and NVIDIA Socket Direct™

Virtualization/Cloud Native

- > SR-IOV and VirtIO acceleration
 - > Up to 1K virtual functions per port
 - > 8 physical functions
- > Support for tunneling
 - > Encap/decap of VXLAN, NVGRE, Geneve, and more
 - > Stateless offloads for overlay tunnels

NVIDIA ASAP² Accelerated Switching & Packet Processing

- > SDN acceleration for:
 - > Bare metal
 - > Virtualization
 - > Containers
- > Full hardware offload for OVS data plane
- > Flow update through RTE_Flow or TC_Flower
- > Flex-parser: user-defined classification
- > Hardware offload for:
 - > Connection tracking (Layer 4 firewall)
 - > NAT
 - > Header rewrite
 - > Mirroring
 - > Sampling
 - > Flow aging
 - > Hierarchical QoS
 - > Flow-based statistics

Cybersecurity

- > Inline hardware IPsec encryption and decryption
 - > AES-GCM 128/256-bit key
 - > RoCE over IPsec
- > Inline hardware TLS encryption and decryption
 - > AES-GCM 128/256-bit key
- > Data-at-rest AES-XTS encryption and decryption
 - > AES-XTS 256/512-bit key
- > Platform security
 - > Hardware root-of-trust
 - > Secure firmware update

Stateless Offloads

- > TCP/UDP/IP stateless offload
- > LSO, LRO, checksum offload
- > Receive side scaling (RSS) also on encapsulated packet
- > Transmit side scaling (TSS)
- > VLAN and MPLS tag insertion/stripping
- > Receive flow steering

Storage Offloads

- > Block-level encryption: XTS-AES 256/512-bit key
- > NVMe over Fabrics offloads for target machine
- > T10 DIF signature handover operation at wire speed, for ingress and egress traffic
- > Storage protocols: SRP, iSER, NFS RDMA, SMB Direct, NVMe-oF

Advanced Timing and Synchronization

- > Advanced PTP
 - > IEEE 1588v2 (any profile)
 - > PTP hardware clock (PHC) (UTC format)
 - > Nanosecond-level accuracy
 - > Line rate hardware timestamp (UTC format)
 - > PPS in and configurable PPS out
- > Time-triggered scheduling
- > PTP-based packet pacing
- > Time-based SDN acceleration (ASAP²)
- > Time-sensitive networking (TSN)
- > Dedicated precision timing card option

RDMA over Converged Ethernet (RoCE)

- > RoCE v1/v2
- > Zero-touch RoCE: no ECN, no PFC
- > RoCE over overlay networks
- > Selective repeat
- > Programmable congestion control interface
- > GPUDirect®

Management and Control

- > NC-SI, MCTP over SMBus and MCTP over PCIe—Baseboard Management Controller interface, NCSI over RBT in Open Compute Project (OCP) 2.0/3.0 cards
- > PLDM for Monitor and Control DSP0248
- > PLDM for Firmware Update DSP0267
- > I²C interface for device control and configuration

Remote Boot

- > Remote boot over Ethernet
- > Remote boot over iSCSI
- > UEFI and PXE support for x86 and Arm servers

Ordering Information

For NVIDIA ordering information, please contact your NVIDIA sales representative or visit the online ConnectX-6 Dx user manuals: **PCIe HHL form factor**, **OCP 3.0 form factor** and **OCP 2.0 form factor**.

*This section describes hardware features and capabilities. Please refer to the driver and firmware release notes for feature availability.

[Learn more](#)

Learn More at [NVIDIA.com/en-us/networking/ethernet/connectx-6-dx](https://www.nvidia.com/en-us/networking/ethernet/connectx-6-dx)

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